

5 –YEAR EMERALD ASH BORER IMPLEMENTATION PLAN

FOR THE

CITY OF REEDSBURG, WI



Emerald Ash Borer Adult



D-shaped Exit Hole

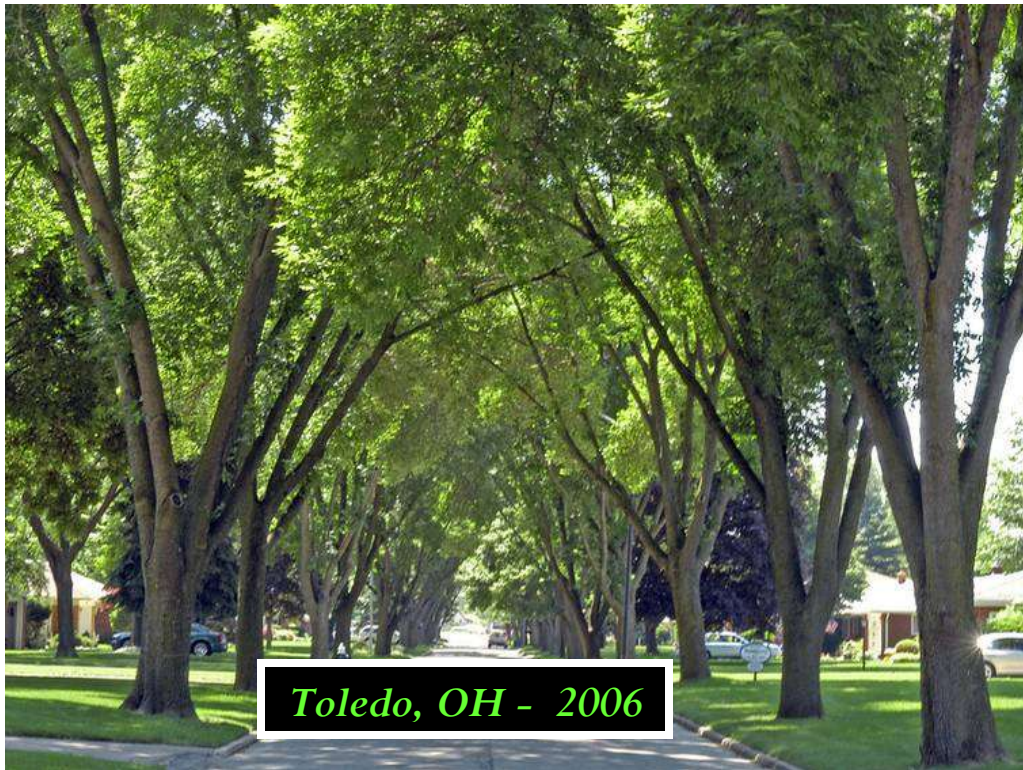


S-shaped Tunnels



Treatments Do Work

**PREPARED BY:
WACHTEL TREE SCIENCE, INC.
October 2014**



Ash trees before EAB devastation – Belvedere Dr. – Toledo, Ohio – June 2006



Untreated Ash trees after EAB Peak – Belvedere Dr. – Toledo, Ohio – June 2009



Dead Ash at the first detection area near Newburg, WI
Detection Date July 2008 Photo taken July 31, 2012



Aerial view of the same area one year later (August 2013)

This is the outcome in heavy ash population forested areas where treatment options are not feasible.



**Stressed Ash Trees
City of Reedsburg
(currently not confirmed EAB)**

Emerald Ash Borer Quarantine



Wisconsin Department of Agriculture, Trade and Consumer Protection
Map Updated 9/3/2014

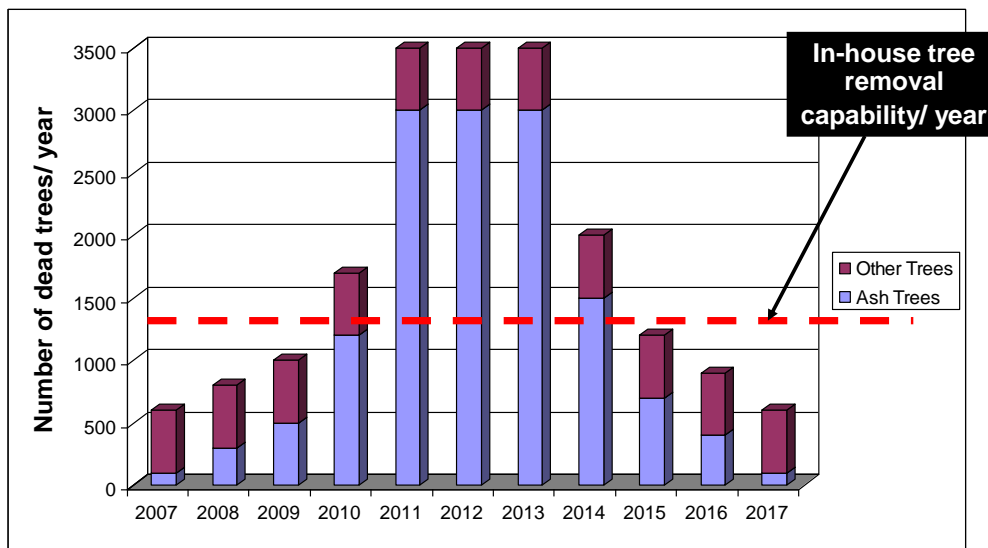


Graph Depicting How Community Resources Can Be Overwhelmed When EAB Population Explodes

No Treatment Option

Ash Tree Death Projection (2010)

Fort Wayne, IN



Courtesy Chad Tinkel - City Forester Fort Wayne, IN

The above graph shows that 3 to 4 years after EAB was discovered in the City of Fort Wayne, there is an exponential cost increase to the city as more contractors had to be hired above and beyond what the city could remove.

Below is another perspective from a City Forester in eastern Michigan, approximately 30 miles from the original discovery of EAB in Detroit.

“We had to use staff from other departments because we didn’t have the money upfront to contract out tree removals or to hire extra staff.” Tom Wilson, from Westland, Michigan, stressed how important and challenging it was to assign enough personnel to the task of facing EAB. He reassigned 4 people from his 18-person streets department and sent them over to work on tree removals full-time. It was only when these additionally-staffed city crews fell behind that contracting was used to keep up with the work. A word of warning from his experience: “When contracting, keep in mind sudden, urgent, high-volume demand for service can make contracted removals more expensive and less available. Disreputable firms commonly appear.” Other municipalities shared an experience similar to Westland’s. These and other communities affected by EAB were left with many tasks and services undone and major purchases deferred.

The City of Reedsburg needs to take the lead on managing the public ash population and cannot simply let EAB run its course. The long term affects are too costly, and the short term affects without treatment and removal detract from the City's credibility.

EAB around Reedsburg

Below is a listing of confirmed municipalities in the region:

<u>Municipality</u>	<u>Municipality Type</u>	<u>Date Confirmed</u>
Dekorra	Town	7/23/14
Lodi	Town	7/17/14
Monroe	Town	7/31/14
Milton	Town	8/5/14
Madison	City	11/22/13
Middleton	City	5/19/14
Delton	Town	7/11/13
Wheatland	Town	4/9/09

Some Communities in Wisconsin that are Currently Treating Public Ash Trees

Oak Creek, Franklin, Milwaukee, West Allis, Wauwatosa, Shorewood, Whitefish Bay, Glendale, Fox Point, Racine, Kenosha, Janesville, Madison, Green Bay, Port Washington, Slinger, Brown Deer, Baraboo

Benefits of Emamectin benzoate Trunk Injection

- 2-year control for Emerald Ash Borer
- Affects only insects that are targeted and will not harm beneficial insects
- Can be applied in a wide variety of weather conditions
- No drift or runoff
- Can be used on larger trees that maybe difficult to spray
- Safe to use, mix and apply
- A wide time frame in which to make effective applications (late-May to mid-September in most seasons)

It is recommended that the City have two employees become WI licensed pesticide applicators (Turf and Landscape Category 3.0). Once properly trained in the use of Emamectin benzoate they will be able to treat various other tree species for a myriad of insect problems. Some pests include: Bagworm, Birch Leafminer, Bronze Birch Borer, Clearwing Borers, Eastern Tent Caterpillar, Flatheaded Borers, Gypsy Moth, Leafminers, Pine Bark Beetles, Sawfly Larvae, and Two Lined Chestnut Borer.

Outdated Messages About EAB

Courtesy of J. Bradford Bonham, Certified Arborist from SW Ohio. Dr. Bonham has been a major public education spokesperson about EAB throughout the Midwest.

The following is a run-down of the most entrenched and problematic of the outdated messages that are still out there. If one or more of these points of conventional wisdom form the foundation of your management strategy, it's time for an update.

"Treatment doesn't work," or "Treatment is not 100%."

Leaving aside federal management of isolated infestations (like Maryland), federal funds for attempting eradication of this pest were pulled early in 2006. Prior to that, if you wanted to treat a tree to spare it from the eradication chainsaws, you would have had to prove that treatment consistently resulted in 100% larval kill in the treated tree (i. e., zero potential for adult emergence from the treated tree). The chance of re-infestation could not be tolerated.

"Treatment will lead to an insecticide-resistant population."

The population dynamics of EAB will not support resistance development. The vast numbers of insecticide-naïve beetles emerging from natural areas and breeding with any insecticide-exposed-but-not-dead beetles will over-ride any trend toward resistance.

"Treatment isn't guaranteed!"

Neither are the antibiotics prescribed to treat pneumonia. University testing of products currently available has established that street-side ash up to 25" diameter at breast height (dbh) can be reliably brought through peak infestation. Testing is underway and is showing positive results on ash up to 55 inches dbh.

"Treatment is not environmentally sound."

Usually sourced to the internet, this claim sometimes alleges specific danger, while other times it is a moving target of vague, amorphous allegations. This recently released document should inject some well-tempered wisdom and reason into these discussions to dispel persistent myths.

http://www.emeraldashborer.info/files/Potential_Side_Effects_of_EAB_Insecticides_FAQ.pdf

"You will have to treat forever!"

Frankly in a municipal setting, you're simply talking service life. Pre-EAB, the average service life for ash in the Midwest was 25 - 40 years. Reliability of currently-available treatments suggests this service life can be preserved with confidence.

"Treatment is not cost-effective"

Early in the history of EAB, with what little was known about short or long-term reliability of treatment, this was true. Annual cost to treat in the commercial arena was in the range of \$12 - \$15 per inch dbh, and confidence in success was reserved for smaller trees. Even on a municipal scale, treatment could not be justified at the time.

However, research has progressed and market forces have caused annual treatment cost per inch dbh to drop drastically. Some communities are beginning to say, "Wait a

minute, the budget consideration for this is not just the cost to remove ash trees, you have to add in stump grinding + cost of replacement trees + cost of installations, over a 6 to 10 year time frame. Not only will we be creating an even-aged stand of replacement trees with the attendant burden of first-decade care, we will lose property value, infrastructure value, ecosystem value, and in many neighborhoods, a sense of place.”

Depending on the local removal and nursery market, the total cost for a remove/replace program (without considering the burden of creating an even-aged stand) may be somewhat more or less than the total cost of removing the decrepit stock and treating the remaining healthy inventory until they age out naturally. You must run your own numbers to assess this, but the prospect of spreading what would otherwise be short-term catastrophic costs out over several decades (and shifting removals back under normal management costs) has great appeal to finance committees, even if they don't understand the "conservation of services" which treatment ensures.

Resetting the Message

Conservation of healthy ash canopy is not only achievable, it is cost-effective. As such, it should be part of integrated forestry management plans. If your plan is outdated, give it an overhaul, and when you do, send out a press release to help reset the message. Many homeowners with ash trees will follow your lead for sensible decision-making.

"Reset" the information posted at your city website. Anything related to treatment options which is more than 2 years old should be pulled because it's freshness-dating has expired. Convey to your readers that anything they see touted on the internet as a "best" or effective treatment, but relying on old Extension fact sheets should be considered suspect. Currently, "old" is pre-2012.

Research on the reliability of treatment continues to improve. New products are under investigation and the work on bio-controls is very active. Take a moment every 6 - 12 months to seek out research updates, and "reset" your own professional knowledge base.

Quick Facts about Reedsburg's Public Ash Population

The City of Reedsburg is responsible for the management of all trees on its property. These trees include the following breakdown of the ash component:

- 974 total ash trees were identified and placed on the City GIS database.
- Of the 974 Ash there are 886 Green Ash and 88 White Ash.
- 846 are located in the street ROW (right-of-way) and 128 are located in parks.
- The ash trees make up 22.6% of the public tree species mix; 21.8% of street trees and 29.5% of park trees.

REEDSBURG ACTION PLAN (Five Year Projection)

Plan Components

1. Over the five year period, begin by removing and replacing, with a diversity of species, all public ash trees with diameters less than 6" dbh. The total trees in this grouping are 18 (3 parks and 15 streets). These trees should be able to be removed by in-house staff. This work should be completed by spring 2015.

Option: If the public sentiment is there, an abutting property owner with ash trees in the terrace that are 5" dbh or less could have the option to have the trees treated by the City at their expense. The property owner would pay the City for the material cost and the City would cover the cost of the labor.
2. After Item #1 is completed, there are 417 ash trees with a condition rating of 60% or less that are 6" and greater dbh. These trees should be removed by poorest condition and largest diameters first. The recommended schedule is:
 - 105 trees by spring of 2016 (all 60% or less condition rating)
 - 104 trees for each of the following years 2017, 2018, and 2019.
3. Replanting is an important component of the overall plan. Increasing species diversity is the desired goal. All 417 planned removals (all diameters, 60% condition or less) may not produce appropriate replanting sites. Some sites may be under overhead utilities, too close to driveway approaches or intersections or conflict with a mature yard tree. A realistic number of appropriate replanting sites are set at 300. Based on available funding, the planting of replacement trees may have to be spread out over multiple years beyond the five year plan. It will need to be determined if replanting can be accomplished with city forces, or because of time constraints, contract planting will be required.
4. Selectively, chemically treat with Emamectin benzoate 85 trees having a condition rating of 70% or greater based on size, location and significance as well as 161 trees 6-12" in diameter having a condition rating of 65%. Treatment of these 246 trees should begin no later than the 2015 growing season. In 2016, treat 293 trees 13" and greater having a condition rating of 65%. Trees require alternate year treatments so the trees treated in 2015 will be re-treated in 2017 and 2019. The trees treated in 2016 will be retreated in 2018.

Results, Costs and Discussion Points

- Following this 5-year plan will reduce the public ash tree population to 539 trees under treatment from the starting inventory of 974 ash trees. This plan reduces the ash component to 12.5% of the total public tree population. It also keeps a significant proportion of the urban street tree canopy that currently exists. As trees are removed, treated trees continue to grow and replacement trees begin putting on new growth.

- Cost of implementation of the 5 year Action Plan - **\$657,176 or approximately \$131,435 per year (Option 1 - Contract); \$329,653 or approximately \$65,931 per year (Option 2 - Hybrid)**. The cost will vary from year to year due to the number and size of trees removed; the number of replacements and alternating years for treatment.
- Overall projected costs can be reduced if city forces are able to perform half the removals for trees over 6" dbh; carry out the treatments; and perform the replanting. **(Option 2)** These are discussions that will need to be held between staff and the City Council. There are (2) 5-year proposed budgets at the end of this section; the first is primarily contracted services, while the second is a hybrid of contracted services and in-house staff.
- After 5 years there will still be approximately 530 treated public ash. At that point it should be determined, based on the level of EAB activity, if these trees should continue to be treated indefinitely on an every other year basis (1/2 of remaining ash population per year) or removed and replaced. The cost of continuing treatment would average \$33,984 every year (contracted) or \$14,807 (in-house).
- The current waste disposal yard located on the north side of the City will not be adequate to handle incoming wood debris from the planned removals. It is recommended that another yard be set aside by the Department of Public Works building and wood utilization opportunities be investigated.

Reedsburg has a unique opportunity that could provide a creative way for ash tree wood utilization. There are currently 2 sawmills located within the city; Meister Log & Lumber and Pearson's Saw Mill. Reedsburg Hardwoods is a large dry kiln facility that can finish sawn lumber.

There will be viable wood available from Ash removals that can be processed into lumber. The challenge is identifying acceptable logs and determining how to keep costs of transportation to a minimum. Due to the close proximity of these mills to the Ash tree population, an opportunity exists where both the City and the mills in the area could reach a mutually beneficial agreement for the handling and transportation of ash logs. It is recommended that open communications begin with these companies so that an agreeable deal can be reached as soon as possible.

Contacts:

Meister Log & Lumber
1440 Laukant St.
Reedsburg, WI 53959
(608) 524-4412

Contacts:

Pearson's Saw Mill
E3906 Cemetery Rd.
Reedsburg, WI 53959
(608) 985-7579

- City staff needs to assess availability of qualified outside tree care firms for contractual work, additional training and equipment needs for removals and treatment, plus determine which programs may need to be reduced or curtailed if the EAB infestation becomes dramatic.

Condition of Ash Trees Sorted by Diameter Ranges

City of Reedsburg - Street Ash Inventory - July 2014							
Condition Rating by Diameter (DBH)							
Condition Rating %	Tree Count	1-5"	6-12"	13-18"	19-24"	25-30"	31" +
10	1	0	0	0	1	0	0
15	1	0	0	1	0	0	0
20	2	0	0	1	1	0	0
25	3	0	0	1	2	0	0
30	5	0	3	0	2	0	0
40	16	2	3	8	3	0	0
45	6	0	1	3	1	1	0
50	39	0	13	18	7	0	1
55	75	0	18	37	14	5	1
60	199	2	38	95	54	8	2
65	413	5	156	198	45	8	1
70	86	6	47	25	7	1	0
Totals	846	15	279	387	137	23	5

City of Reedsburg - Park Ash Inventory - July 2014							
Condition Rating by Diameter							
Condition Rating %	Tree Count	1-5"	6-12"	13-18"	19-24"	25-30"	31" +
0	1	1	0	0	0	0	0
40	10	0	0	7	2	1	0
45	5	0	0	5	0	0	0
50	7	0	0	4	1	1	1
55	14	0	2	5	4	2	1
60	39	1	4	20	11	3	0
65	47	1	5	31	7	3	0
70	5	0	5	0	0	0	0
Totals	128	3	16	72	25	10	2

Condition of Ash Trees Sorted by Diameter Ranges

City of Reedsburg - All Public Ash Inventory - July 2014							
Condition Rating by Diameter (DBH)							
Condition Rating %	Tree Count	1-5"	6-12"	13-18"	19-24"	25-30"	31"+
0	1	1	0	0	0	0	0
10	1	0	0	0	1	0	0
15	1	0	0	1	0	0	0
20	2	0	0	1	1	0	0
25	3	0	0	1	2	0	0
30	5	0	3	0	2	0	0
40	26	2	3	15	5	1	0
45	11	0	1	8	1	1	0
50	46	0	13	22	8	1	2
55	89	0	20	42	18	7	2
60	238	3	42	115	65	11	2
65	460	6	161	229	52	11	1
70	91	6	52	25	7	1	0
Totals	974	18	295	459	162	33	7

TREE REPLACEMENT

Contract replacement tree planting costs for a 2" caliper B&B (balled and burlaped) tree with a 1-year guarantee can vary from \$250 to \$350 per tree. For budgeting purposes, **an average of \$300 per tree** is being recommended. The City should consider contracting with the tree installer to provide supplemental watering of at least three times during the growing season if the City is not equipped to perform this task. If City forces are used to perform the planting and purchases trees directly from wholesale nurseries, the average cost per tree would be approximately \$160. Labor cost from General Operating budget.

Project Administration

Administration costs are roughly \$5,000-\$7,000 per year using an outside consulting firm. The city could reduce this budget to approximately \$3000 per year if they would take care of administration. They should understand that a considerable amount of additional time will be needed to plan and administer yearly EAB management operations. Pursuing in-house administration would be another justification to hire the part time City Forester recommended in the Urban Forest Management Plan.

RECOMMENDED FUNDING NEEDS

Five Year Total = \$657,176 (Option 1) Average Yearly Allocation = \$131,435

Five Year Total = \$329,653 (Option 2) Average Yearly Allocation = \$65,931

Treatments (Contract) –

Trunk Injection; 246 trees (currently 2,710 DBH inches) @ \$8.00/DBH inch beginning Spring 2015 for trees with a condition rating of **70%** and 6-12" with a condition rating of **65%** and continuing every other year for a minimum of three cycles = \$21,680 in 2015, 2017 and 2019. Alternate year trunk injection; 293 trees (currently 4,842 DBH inches) @ \$8.00/DBH inch beginning Spring 2016 for trees 13"+ with a condition rating of **65%** and continuing every other year for a minimum of two cycles = \$38,736 in 2016, and 2018.

Total 5-years = \$142,512

Treatments (In-House) –

Spring 2015 - 246 trees (2,710 DBH inches) @ 7 ml/dbh inch = 18,970 ml.

Chemical cost per milliliter = \$0.56 or \$3.92/dbh inch

Total chemical cost = \$10,623 times three cycles = \$31,869

Treatments (In-House) -

Spring 2016 - 293 trees (4,842 DBH inches) @ 7 ml/dbh inch = 33,915 ml.

Chemical cost per milliliter = \$0.56 or \$3.92/dbh inch

Total chemical cost = \$18,992 times two cycles = \$37,984

Total 5-year chemical cost = \$698,53 (Does not include cost of in-house labor)

Removals (Contract) –

(6" and greater DBH poor condition trees that are not recommended for treatment) – 417 trees = \$363,600

Removals (In-House) –

If one half of the 417 removals are performed using City forces, then the overall contract removal total cost would be reduced to approximately \$181,800

Note: Ash that are less than 6" in diameter (104 trees) are proposed to be removed by DPW staff under the General Operating budget.

Replacement Tree Planting (Contract) – 300 trees @ \$300/tree = \$90,000

Replacement Tree Planting (In-House) – 300 trees @ \$160/tree = \$48,000

Project Administration = \$29,064 (Contract); \$15,000 (In-house); if outside consultant is required

Contingency = \$32,000 (Contract); \$15,000 (In-house)

CITY OF REEDSBURG - EAB INITIATIVE						
5-YEAR PROPOSED BUDGET - Contract Services						
	Maintenance Activity					
YEAR	REMOVALS	PLANTING	TREATMENT	ADMINISTRATION	CONTINGENCY	BUDGET/YEAR
2015	in-house	\$18,000.00	\$21,680.00	\$4,960.00	\$4,000.00	\$48,640.00
2016	\$91,050.00	\$18,000.00	\$38,736.00	\$7,092.00	\$7,550.00	\$162,428.00
2017	\$90,850.00	\$18,000.00	\$21,680.00	\$4,960.00	\$6,450.00	\$141,940.00
2018	\$90,850.00	\$18,000.00	\$38,736.00	\$7,092.00	\$7,550.00	\$162,228.00
2019	\$90,850.00	\$18,000.00	\$21,680.00	\$4,960.00	\$6,450.00	\$141,940.00
TOTALS	\$363,600.00	\$90,000.00	\$142,512.00	\$29,064.00	\$32,000.00	\$657,176.00
Assumptions:						
2015 (18) ash, 5" or less DBH removed by in-house staff; funding through general operation budget						
2016 (105) ash, 6" or greater DBH and 60% or less condition removed by contract						
2017, 2018, 2019 (104) ash per year, 6" or greater DBH and 60% or less condition removed by contract						
2015 (246) ash, 6" or greater and 70% condition treated by contract, 6-12" and 65% condition treated by contract; retreat in 2017 and 2019						
2016 (293) ash, 13" or greater and 65% condition treated by contract; retreat in 2018						
Replacement planting (\$300/tree); will vary from year to year based on appropriate replanting sites; 60 trees/year						
CITY OF REEDSBURG - EAB INITIATIVE						
5-YEAR PROPOSED BUDGET - Hybrid Contract Services/In-house Staff						
	Maintenance Activity					
YEAR	REMOVALS	PLANTING	TREATMENT	ADMINISTRATION	CONTINGENCY	BUDGET/YEAR
2015	in-house	\$9,600.00	\$10,623.00	\$3,000.00	\$3,000.00	\$26,223.00
2016	\$45,525.00	\$9,600.00	\$18,992.00	\$3,000.00	\$3,000.00	\$80,117.00
2017	\$45,425.00	\$9,600.00	\$10,623.00	\$3,000.00	\$3,000.00	\$71,648.00
2018	\$45,425.00	\$9,600.00	\$18,992.00	\$3,000.00	\$3,000.00	\$80,017.00
2019	\$45,425.00	\$9,600.00	\$10,623.00	\$3,000.00	\$3,000.00	\$71,648.00
TOTALS	\$181,800.00	\$48,000.00	\$69,853.00	\$15,000.00	\$15,000.00	\$329,653.00
Assumptions:						
2015 (18) ash, 5" or less DBH removed by in-house staff; funding through general operation budget						
2016 (53) ash, 6" or greater DBH and 60% or less condition removed by contract; (52) removed in-house						
2017, 2018, 2019 (52) ash per year, 6" or greater DBH and 60% or less condition removed by contract; (52) removed in-house						
2015 (246) ash, 6" or greater and 70% condition treated in-house, 6-12" and 65% condition treated by contract; retreat in 2017 and 2019						
2016 (293) ash, 13" or greater and 65% condition treated in-house; retreat in 2018						
Replacement planting in-house (\$160/tree); will vary from year to year based on appropriate replanting sites; 60 trees/year						
Administration and Contingency costs reduced due to greater reliance on the use of City forces						

TREE REMOVAL CONTRACT COSTING			
(includes stump removal and restoration)			
DIAMETER	EST. DIAMETER	UNIT PRICE	EXTENDED
CLASS	INCHES	PER INCH	TOTAL
6-12"	2988	\$20.00	\$59,760.00
13-18"	6918	\$24.00	\$166,032.00
19-24"	3370	\$29.00	\$97,730.00
25-30"	884	\$34.00	\$30,056.00
31"+	247	\$40.00	\$9,880.00
TOTAL TREE REMOVAL			\$363,458.00

RECOMMENDED REPLACEMENT SPECIES

Larger Maturing - No Overhead Utilities or Mature Overstory Trees Present			
COMMON NAME	SCIENTIFIC NAME	MATURE HEIGHT	PARKS
Ft. McNair Red Horsechestnut	Aesculus x carnea 'Ft. McNair'	35-40'	X
Yellow Buckeye	Aesculus octandra	60-75'	
Bitternut Hickory	Carya cordiformis	60'	X
Northern Catalpa	Catalpa speciosa	40-60'	X
Chicagoland Hackberry	Celtis occidentalis 'Chicagoland'	40-60'	
Katsuratree	Cercidiphyllum japonicum	40-60'	
Turkish Filbert	Corylus colurna	40-50'	
Ginkgo	Ginkgo biloba cultivar (male only)	50-80'	
Skyline Honeylocust	Gleditsia triacanthos 'Skycole' PP 1619	50-60'	
Kentucky Coffeetree	Gymnocladus dioica	50-60'	
London Planetree	Platanus x acerifolia 'Ovation' or 'Morton Circle'	70-100'	
Eye Stopper Corktree	Phellodendron lavallei 'Longnecker'	45'	
Swamp White Oak	Quercus bicolor	75'	
Bur Oak	Quercus macrocarpa	60-80'	X
Hybrid Swamp x Bur Oak	Quercus x schuettei	75'	
Triumph Elm	Ulmus 'Morton Glossy'	55'	
Accolade Elm	Ulmus japonica x wilsoniana 'Morton'	70'	
Small Maturing - Overhead Utilities and/or Mature Overstory Trees Present			
COMMON NAME	SCIENTIFIC NAME	MATURE HEIGHT	PARKS
Ohio Buckeye	Aesculus glabra	35'	X
Robin Hill Serviceberry	Amelanchier x grandiflora 'Robin Hill'	20-25'	X
Cumulus Serviceberry	Amelanchier x lamarckii 'Cumulus'	20-25'	X
Musclewood	Carpinus caroliniana	25-30'	X
Amur Maackia	Maackia amurensis	20-30'	X
Adirondak Crabapple	Malus 'Adirondak'	20'	
Jackii Crabapple	Malus baccata 'Jackii'	25-30'	
Royal Raindrops Crab	Malus 'JFS-KW5'	20'	
Redbud Crabapple	Malus x zumi calocarpa	20'	
Ironwood	Ostrya virginiana	25'	
Ivory Silk Tree Lilac	Syringa reticulata 'Ivory Silk'	25'	